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Assignment 2

There are several processes that make up the graphics pipeline in a computer, and these processes are divided between the CPU and the GPU, with the CPU handling the data and the GPU handling the rendering.

First, the CPU has to link the attribute variables in a vertex shader program to the GPU buffers, which are the part of the GPU memory that hold the data for the attribute variables. Anything else that the shaders need to use in order to render are also copied to the shader program. These variables are called "uniform" because they do not change throughout the process of rendering. Now that the variables are loaded into the memory of the GPU, it can begin the rendering process, starting with the execution of the vertex shader. The shader is called on each vertex in a geometric primitive shape defined in the model's world coordinates. This process involves several transformations to move the model into the correct place in the scene, placing it in front of the "virtual camera," and projecting the world coordinates to a unit cube, which is like the base measurement of length, distance, or space in the scene. Once the object has been placed, anything that is outside the view of the camera is clipped out to reduce the processing load. Next, the completed model data is mapped to the "normalized device coordinates" in the GPU, essentially converting the computer's "vision" of the object into a format that can be displayed on a screen using pixels. The fifth step in the processes is rasterization of a geometric primitive, where the computer determines which pixels in the raster image are within its boundaries. After the raster process, the second shader, the fragment shader is executed on each pixel of the geometric primitive to determine the color of the pixel. The next to last process is compositing, where the color of the pixel determined by the fragment shader is combined with the color of the pixel already determined by the output draw buffer. The final step in the process is for the GPU to draw the framebuffer of the completed image on the screen.

https://runestone.academy/runestone/books/published/learnwebgl2/01_the_big_picture/3_3d_graphics_pipeline.html#assessments

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